City of Greensboro Stormwater Management Division Credit Policy

January 1996

Revised: February 2004

Index

Section I

I. Introduction

Because the City of Greensboro is not located on a major river system, the City's natural supply of water is limited. With the increased water demand and pollution potential associated with the continued urban growth of our community, managing and protecting stormwater runoff has become an important component of the City of Greensboro's water resources management.

On July 1, 1994, the City of Greensboro's Stormwater Management Division was established within the City's Department of Environmental Services. This new stormwater division has the responsibility to manage and coordinate the delivery of all stormwater services within the City. New services provided include stormwater quality management and comprehensive planning. Other important elements of the new stormwater program include:

- Developing a masterplan to identify and provide for the future needs of the City's stormwater infrastructure.
- Identifying and reducing the amount of pollutants carried by stormwater runoff into the community's lakes and streams.
- Working with the community to develop and implement efficient and cost-effective stormwater designs.
- Improving the maintenance of the existing stormwater drainage system.
- Educating citizens about the importance of stormwater management and non- point source prevention measures and how they can help.

These new services as well as services in the Stormwater Maintenance and Street Cleaning Divisions are funded by the stormwater utility fee. The administrative credit program recognizes a variety of activities that support the City's stormwater management objectives.

This document represents a Stormwater fee credit program to recognize customers whose activities compliment Greensboro's stormwater goals. Non-single family residential, commercial, and industrial customers (that have taken measures to reduce the impacts of storm water runoff on stormwater conveyance systems and surface water quality), may through this fee credit program be eligible for a reduction in storm water fees of up to forty percent (40%).

Section II

II. Non Point Source Pollution Control Credit Policy

Introduction

All of the following criteria must be met to receive a five percent (5%) reduction in storm water service fee. Criteria to be fulfilled in order to qualify for this non-structural storm water credit include:

Criteria 1: Educational Programs
Criteria 2: On-site Refuse Management Program
Criteria 3: On-site Storm Water System Maintenance & Cleaning Program
Criteria 4: Paved Area Sweeping Program
Criteria 5: Used Motor Oil Recycling Program

Upon approval and completion of a storm water credit application, credit will be applied after completion of a satisfactory inspection. The purpose of the inspection is to make sure the above criteria are being met. If any particular criteria is not applicable to an applicant's property or land use, the applicant may apply for an exemption. Each submittal should include a short description covering site history and justification for the request. All requests will be reviewed on an individual basis with findings of the review transmitted back to the customer within 45-days of receipt.

Educational Programs

Organizations wishing to receive Storm Water Fee credits for educating organizational personnel in the areas of environmental awareness must agree to meet the following minimum standards:

a) Devote 30 minutes per quarter to educating organizational personnel in areas of environmental concerns. Organizations will be required to submit programs/agenda for environmental education sessions which will include information concerning time(s), place(s), and topic(s) to be covered during session as well as confirmation that 50% of employer personnel participation goal was met. Organizations will also be required to conduct pre and post session surveys
b) Organization will post environmental information (obtained from Storm Water Services) in clearly visible, personnel frequented areas.
c) Distribute environmental literature (obtained from Storm Water Services) to all organizational personnel on a quarterly basis.

Note: Required educational materials will be made available through the City of Greensboro Environmental Programs Division.

On-Site Refuse Management Program

The following minimum criteria must be satisfied to receive credit for the On-Site Refuse Management Program:

a) Identify or develop the organization's on-site refuse control management plan.
b) Submit litter reduction program encouraging personnel and public to properly dispose of waste materials for approval.
c) Initiate and maintain a comprehensive on-site waste material recycling program. Certification of participation in such a program is required.
d) Provide and maintain refuse container covers designed to eliminate exposure to the environment (wind, rain, snow, etc.).

On-Site Storm Water System Maintenance & Cleaning Program

The following minimum criteria must be satisfied to receive credit for the On-Site Storm Water System Maintenance & Cleaning Program:

a) Submit a detailed management plan for cleaning and maintaining on-site storm water structures. The management plan must address the following structures (where applicable):
    i) Catch Basins & Outfalls
        - must be cleaned a minimum of 2 times per year.
    ii) Curb and Gutter
        - must be cleaned a minimum of 4 times per year.
    iii) Water Quality Best Management Practices (BMPs)
        - will be required to be routinely maintained and inspected on an annual basis (minimum).

Paved Area Sweeping Program

The following minimum criteria must be satisfied to receive credit for the Paved Area Sweeping Program:

a) Develop, submit, and document implementation of a detailed management plan for the paved area sweeping needs.
b) All paved areas must be swept a minimum of once weekly.

Used Motor Oil Recycling Program

The following minimum criteria must be satisfied to receive credit for the Used Motor Oil Recycling Program:

a) Offer and maintain an on-site, used motor oil recycling collection facility.
b) Be able to document disposal of used motor oil at registered oil recycling facility if criteria do not apply.
c) Display City of Greensboro Used Motor Oil Recycling informational material in clearly visible, publicly frequented on-site locations.

Section III

III. Stormwater Quality and Runoff Control Credit Policy

A. Introduction

Eligible stormwater customers may apply for a maximum of thirty-five percent (35%) Stormwater Fee Credit. The actual percentage of fee credit a customer will receive will be determined through an evaluation of the quality and the rate in which the stormwater leaves the customer's property. The 35% maximum credit is made up of the following two components:

Stormwater Quality Control Credit	15% Maximum
Stormwater Runoff Rate Control Credit	20% Maximum
Total Water Quality/Runoff Credit	35% Maximum

B. Stormwater Quality Control Credit Policy

To achieve a fifteen percent (15%) water quality credit, a minimum of seventy percent (70%) of site stormwater runoff must be routed through one of the water quality Best Management Practice (BMP) systems listed in Table I (Appendix B). The percentage of water quality credit will be calculated based on the following equation:

Credit = % Total Drainage Flow x BMP % Removal Allowance x 0.15 Max. Water Quality Credit.

To achieve credit for pollutant removals above the removal values listed in Table 1 (Appendix B), the property owner must complete and submit for acceptance findings which quantify higher water quality goals are being achieved. This documentation must be prepared by a registered engineer in the State of North Carolina and be accompanied by certified laboratory water quality results. Percent removals are based on typical water quality characteristics of actual versus typical pre-developed land use which were taken from Table 2 (Appendix C). The lowest calculated percent removal for any single water quality parameter analyzed will be equal to the maximum achievable percent removal allowance for the site.

All stormwater BMP structural controls must be designed in accordance with the City of Greensboro Stormwater Management Manual. All other water quality protection structural control systems will be considered on a case-by-case basis. Plans and design calculations are required for consideration of credits for all water quality protection control systems other than those listed in Table I (Appendix B). These plans and design calculations shall be prepared by a registered engineer in the State of North Carolina and shall include an estimate of percent pollutant removal capabilities along with a schematic design of the proposed system. Innovative solutions addressing stormwater quality issues are welcomed.

<u>National Pollutant Discharge Elimination System Storm Water Permit Holders</u>
The United States Environmental Protection Agency requires certain types of industry to obtain and support a National Pollutant Discharge Elimination System (NPDES) permit to manage / monitor industrial site storm water runoff. Typically, an NPDES Stormwater permit will require the

specified industry to conduct extensive quarterly or semi-annual storm water quality monitoring. Those customers that have a NPDES Storm Water permit but do not have any of the BMP's referenced in Table 1 (Appendix B) in place, may qualify for a water quality credit. In order to be considered for a water quality credit, these customers must submit (1) certification that they are in compliance with all aspects of their NPDES Storm Water permit, and (2) certified copies of the results of NPDES permit required annual sampling.

C. Storm Water Runoff Control Credit Policy

A twenty percent (20%) Storm Water Fee Credit may be granted in cases where the post developed rate of runoff is less than or equal to the runoffs rates at pre-development. Properties that reduce their peak discharge rate to pre-developed conditions are eligible to receive a storm water runoff control credit. If site conditions do not allow for a complete reduction to the pre-developed peak discharge rate, the credit will be determined proportionally based on the amount of reduction attained (i.e., if the developed peak discharge is reduced by 80 percent of the differential runoff, then the corresponding credit would be 0.80 x 20% =16%). Runoff rate analysis is to be based on a 10-year storm event.

Section IV - VI

IV. Enforcement Policy

In the event a credit is awarded, the City reserves the right at any time to review the application for accuracy and site for compliance. If after review, the application is found to be inaccurate or minimum water quality goals are not being achieved, the City may without further review discontinue credit. It will be the responsibility of the customer to prove storm water control goals are being met prior to the credit being reissued.

1. In the event that storm water structural controls are in place, the City reserves the right to periodically inspect these facilities to ensure that these facilities are being adequately maintained and pollutant removal goals are being met. If an inspection indicates a problem, the customer will be notified in writing and given 30 days to correct the discrepancy. After the discrepancy has been corrected the owner must provide written documentation that the facility is now operating and meeting its design objectives. The storm water services credit will be terminated on the following billing cycle if the discrepancy is not corrected.

2. All structural water quality control systems that are not listed in Table 1 (Appendix B) may require, at the request and at no cost to the City, periodic certified laboratory water quality sampling and result reporting to ensure that water quality standards are being met.

V. Renewal Process

Credits will be applied to accounts once application is processed. Application renewal will be required one year subsequent to processing of application.

VI. Appeals Process

Appeals of credit decisions will be made to the City of Greensboro's Storm water Services Manager.

Section VII

VII. Stormwater Services Fee Credit Summary

This document represents a Stormwater fee credit program to recognize customers whose activities complement Greensboro's stormwater goals. Non-single family residential, commercial, and industrial customers that have taken measures to reduce the impacts of stormwater runoff on stormwater conveyance systems and surface water quality, may be eligible for a credit of up to forty percent (40%) of their stormwater fee. Customers that currently are being billed for more than the minimum user rate of one (1) ERU per billing cycle are eligible to participate in the credit program. Applications received prior to the application deadline will be reviewed for storm water fee credit. Pending approval of the application, fee credit will be applied to the City Services account during the following billing cycle. Applications received after the application deadline will be considered during the following quarter.

Typical instances in which credit may be considered include implementation of:

- Non Point Source Pollution (non-structural) controls
- Water quality (structural) controls
- Runoff (structural) controls

The following is a summary of stormwater credits that will be applied to your City Services statement.

Non Point Source Pollution Control Credit Policy Directly related to a pre- treatment of the source of pollution through non-structural methods.	5 credits
Stormwater Quality Credit Policy Directly related to percent removal allowances for in-place BMP structural water quality controls.	15 credits (Max.)
Runoff Control Credit Policy Directly proportional to percent reduction in peak runoff rates towards pre-development runoff rates.	20 credits (Max.)
MAXIMUM OBTAINABLE STORMWATER CREDITS	40 credits

Further questions on this credit policy, please contact the Stormwater Management Division, City of Greensboro at (336) 333-6502.

Appendix A

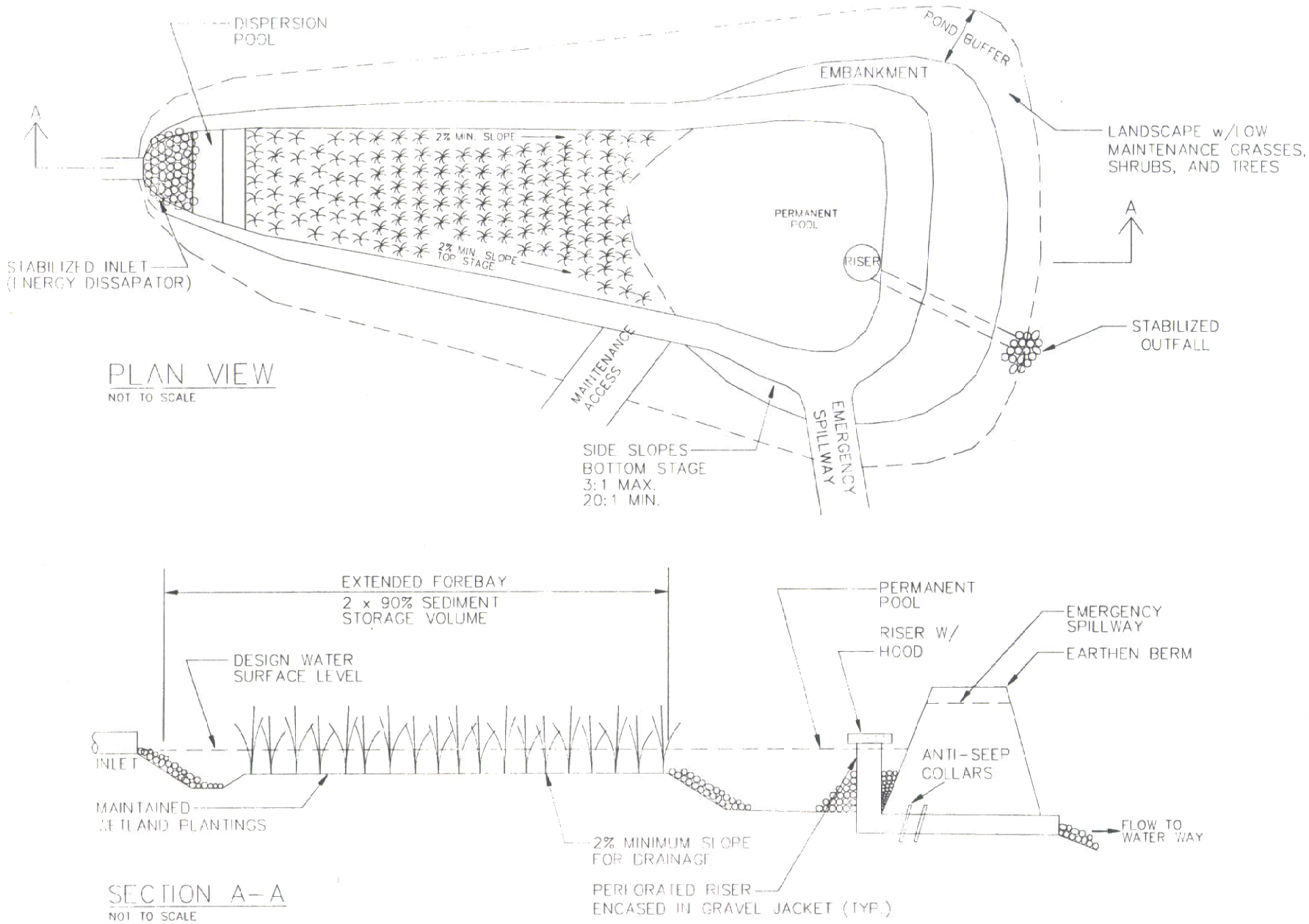
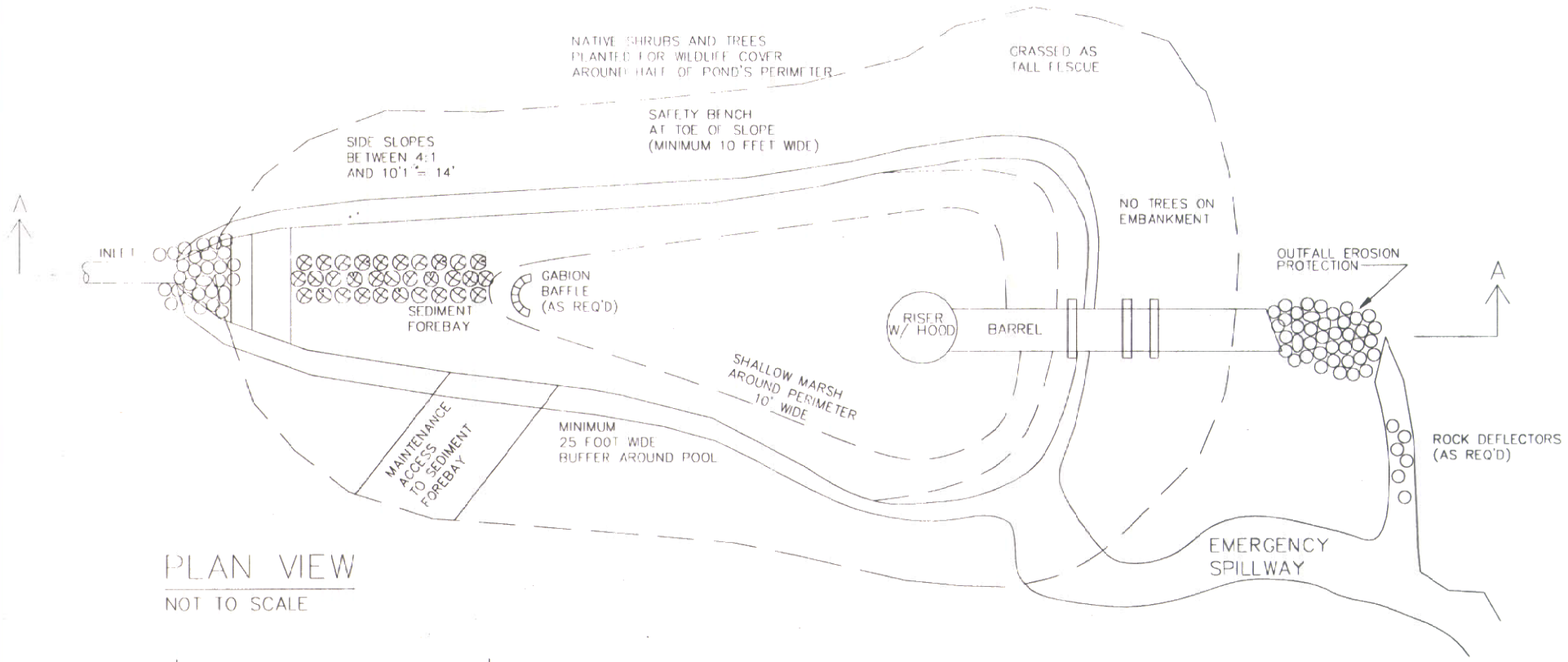
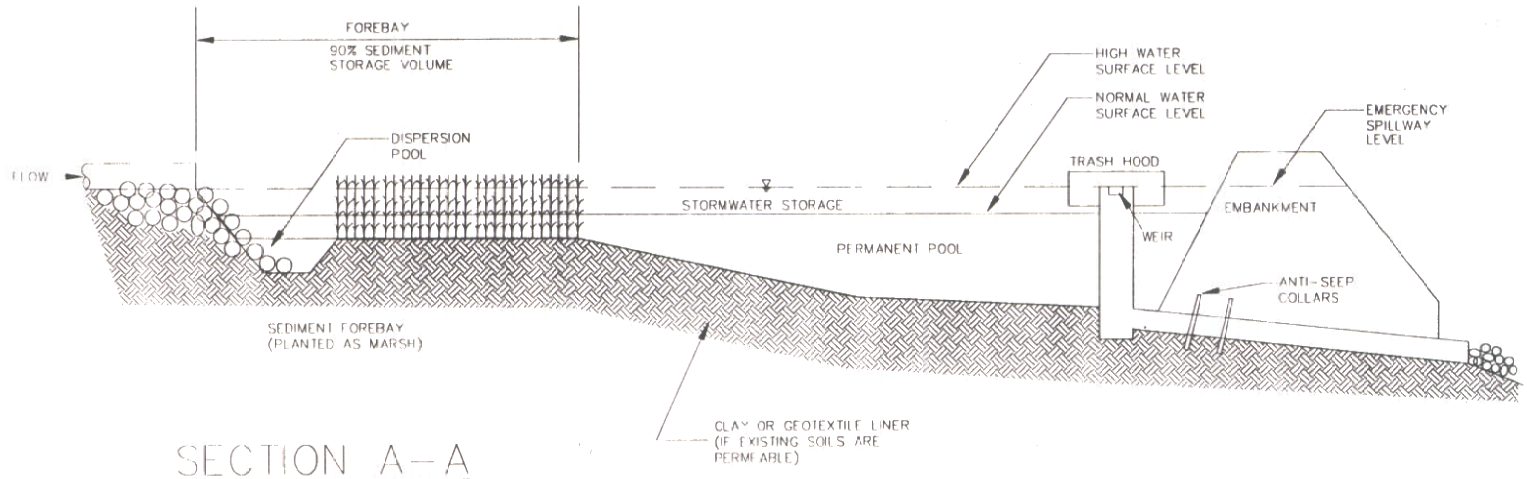


FIG. 1

SCHEMATIC OF TYPICAL EXTENDED DETENTION POND



PLAN VIEW
NOT TO SCALE

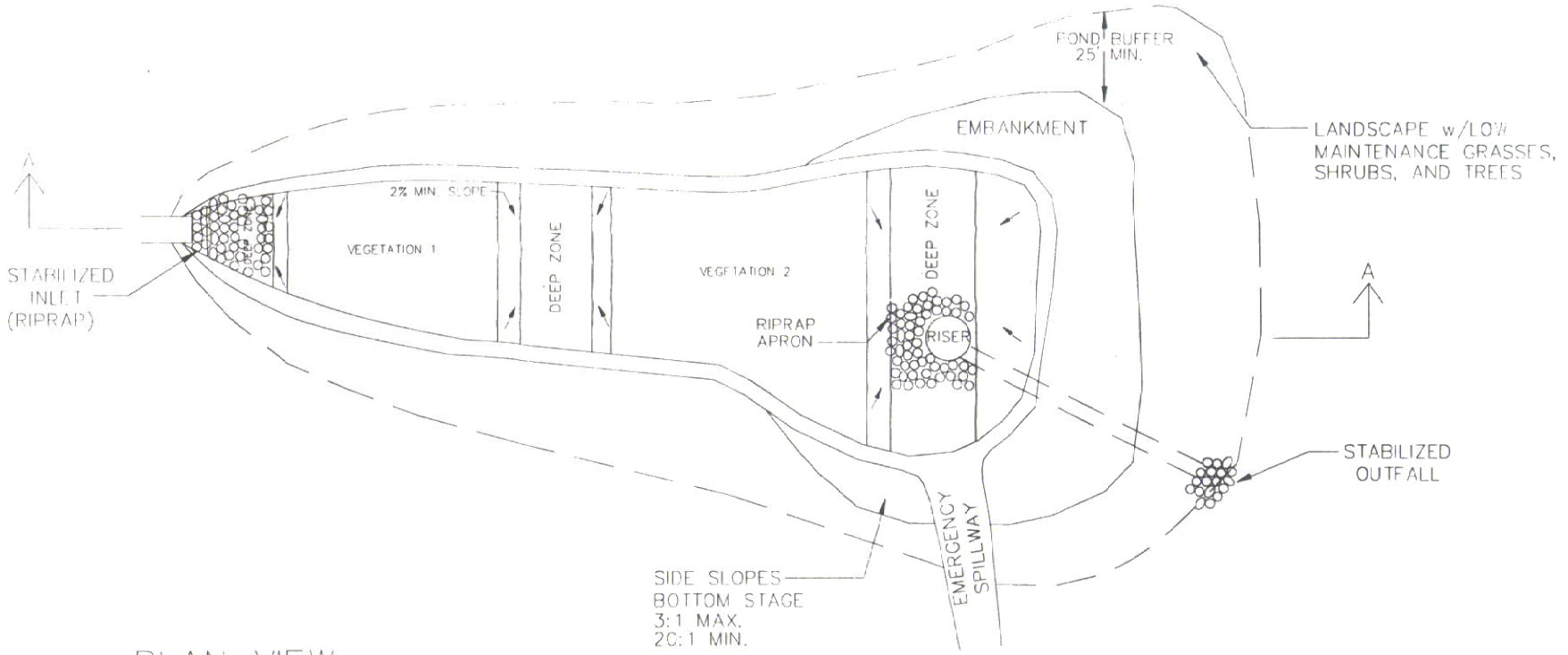


SECTION A–A
NOT TO SCALE

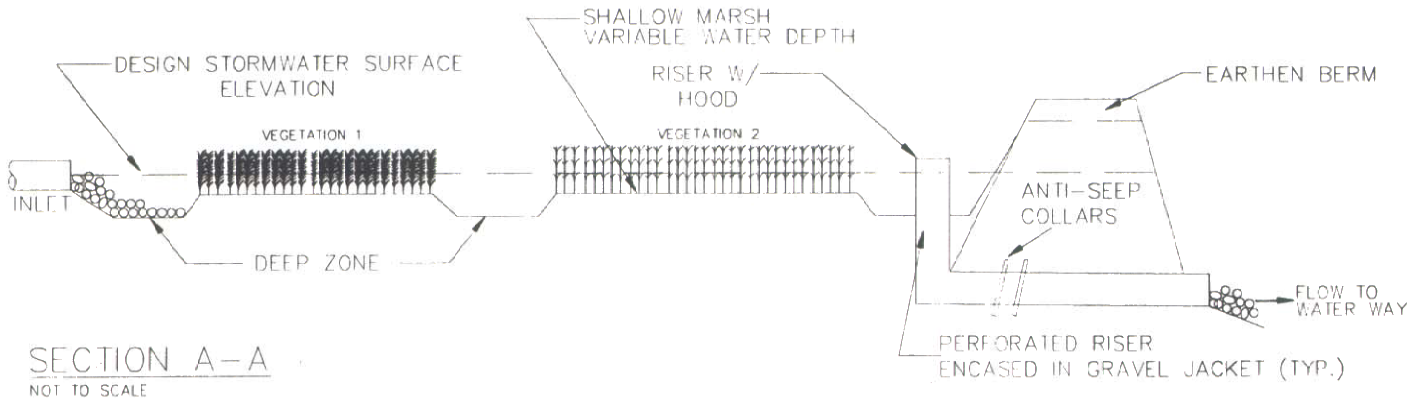
* NOTE: DESIGN IN THE WATERSHED AREA MUST MEET MINIMUM DESIGN REQUIREMENTS PER GUILFORD COUNTY WATER QUALITY PROTECTION GUIDELINES

FIG. 2

SCHEMATIC OF TYPICAL WET DETENTION POND



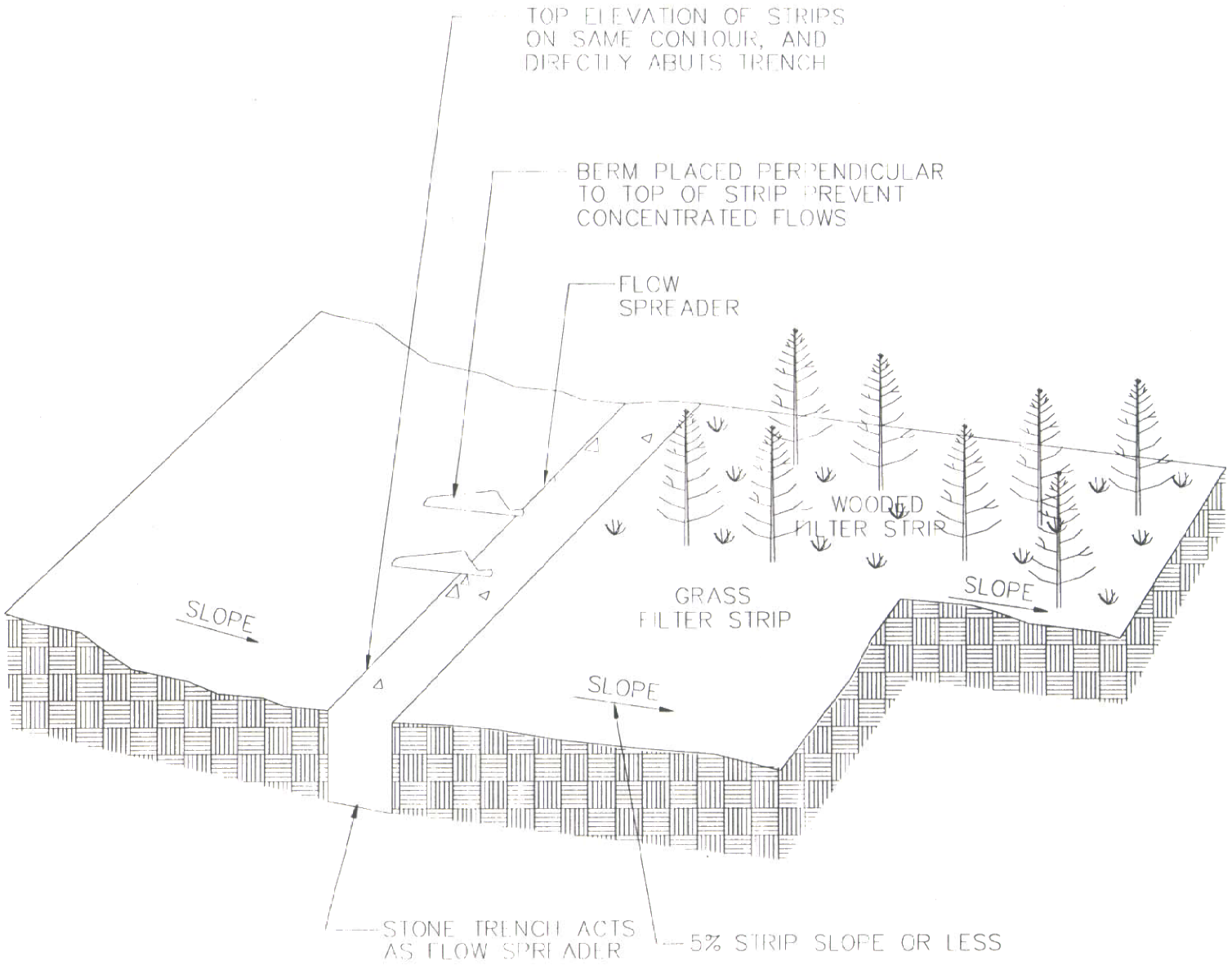
PLAN VIEW
NOT TO SCALE



SECTION A-A
NOT TO SCALE

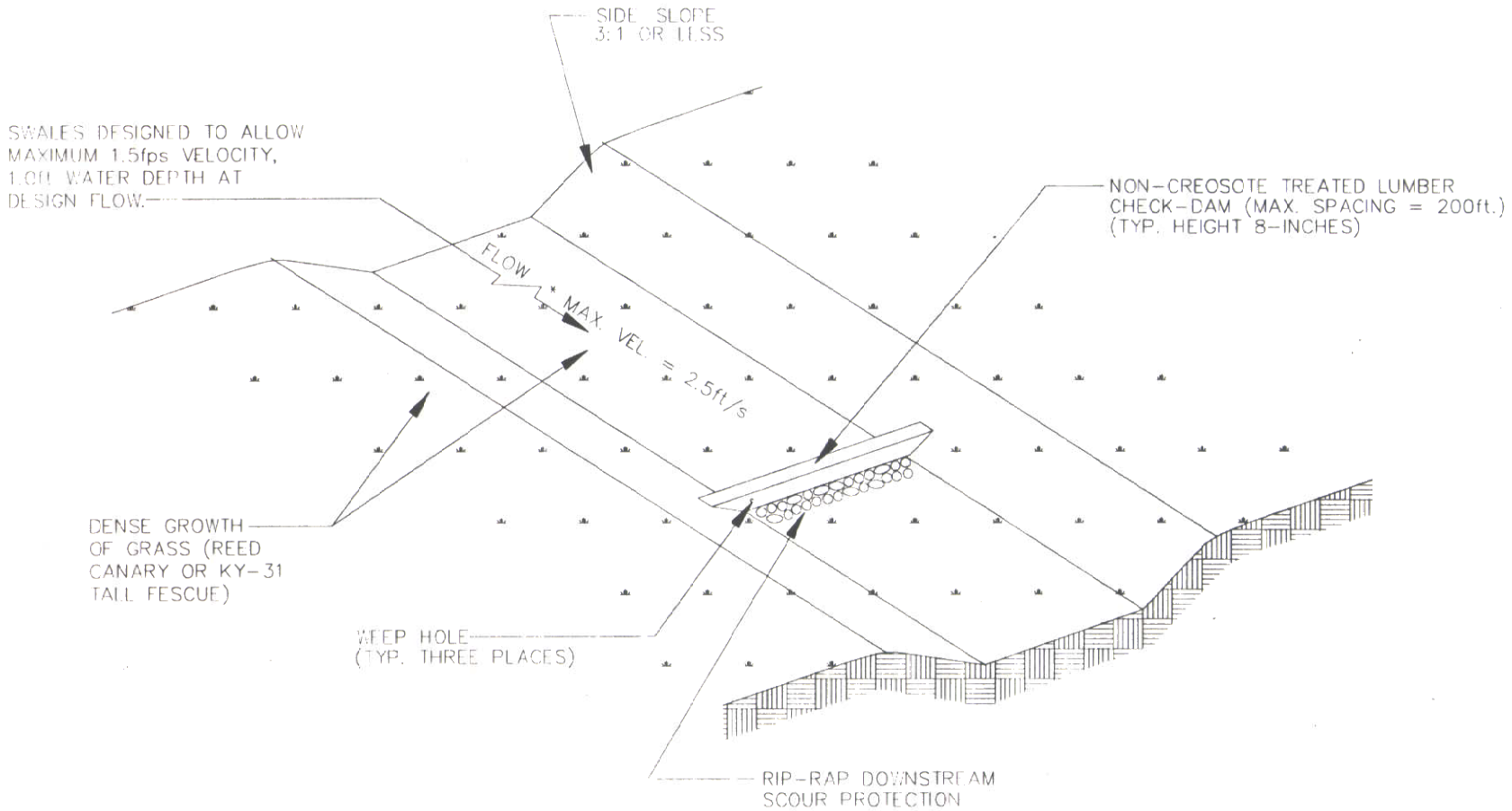
FIG. 3

SCHEMATIC OF TYPICAL CONSTRUCTED WETLANDS



SCHEMATIC OF A FILTER STRIP

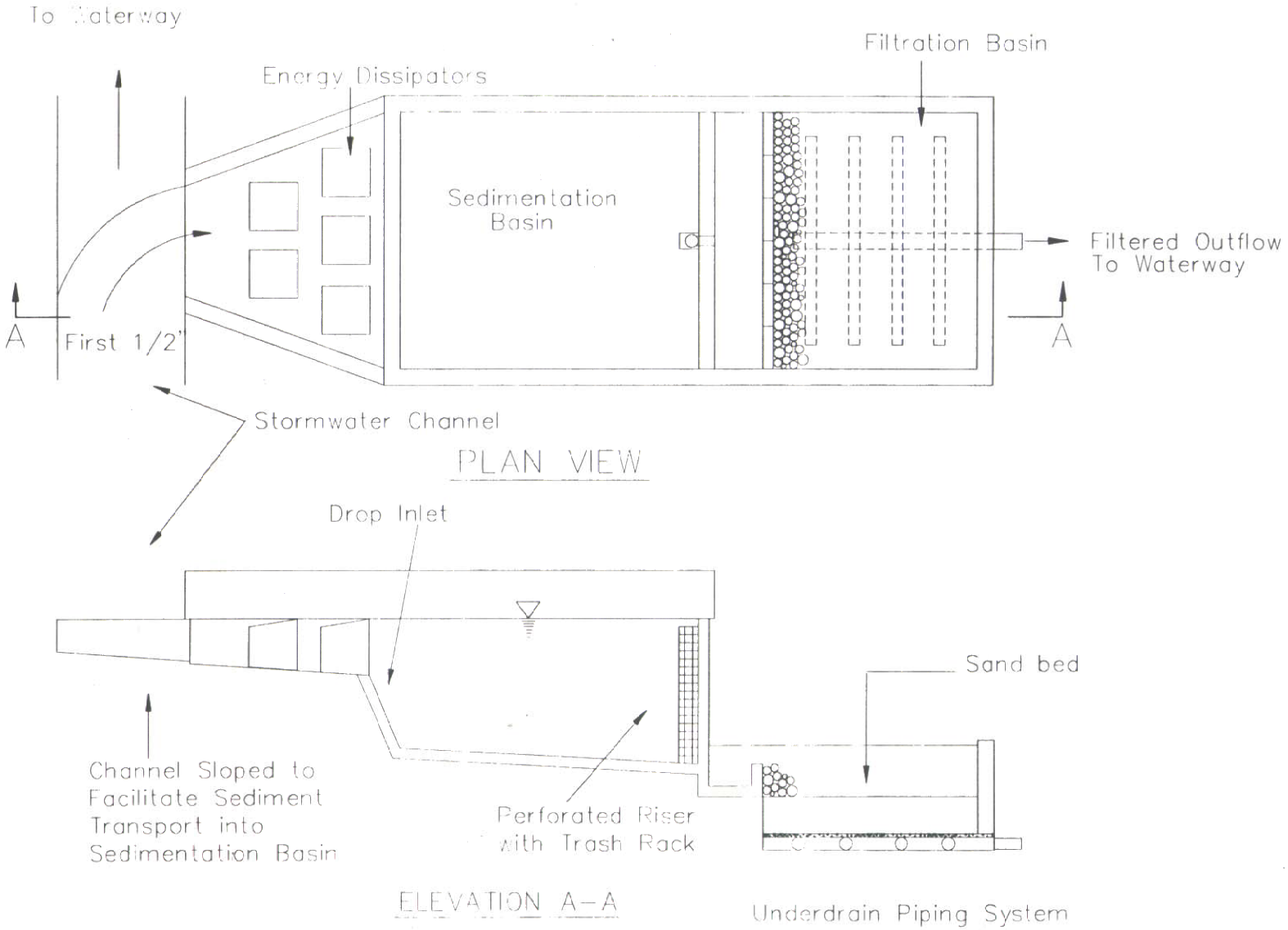
FIG. 4



* MAXIMUM DEPTH @ DESIGN FLOW = 1.0 FEET

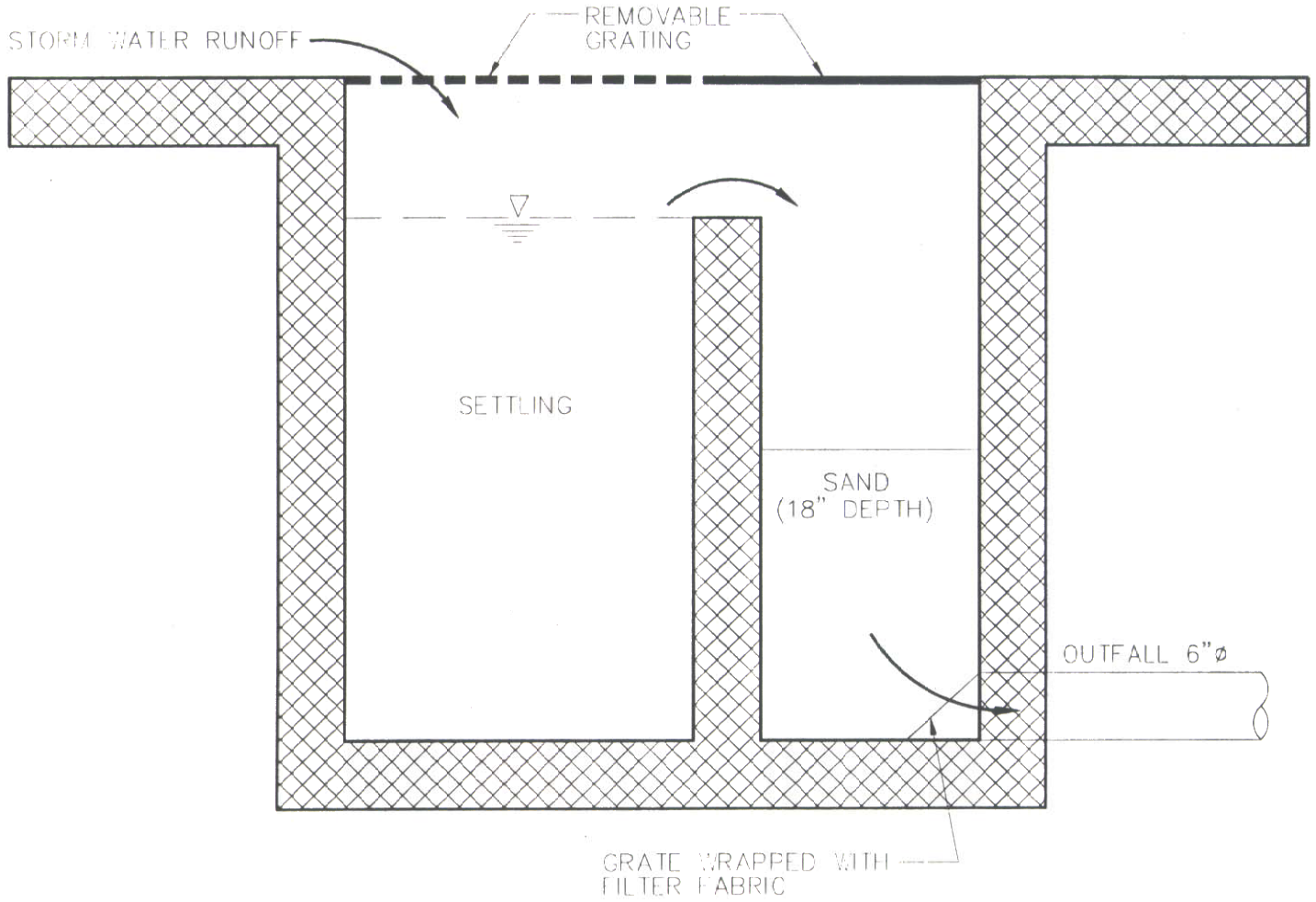
SCHEMATIC OF A GRASS SWALE

FIG. 5



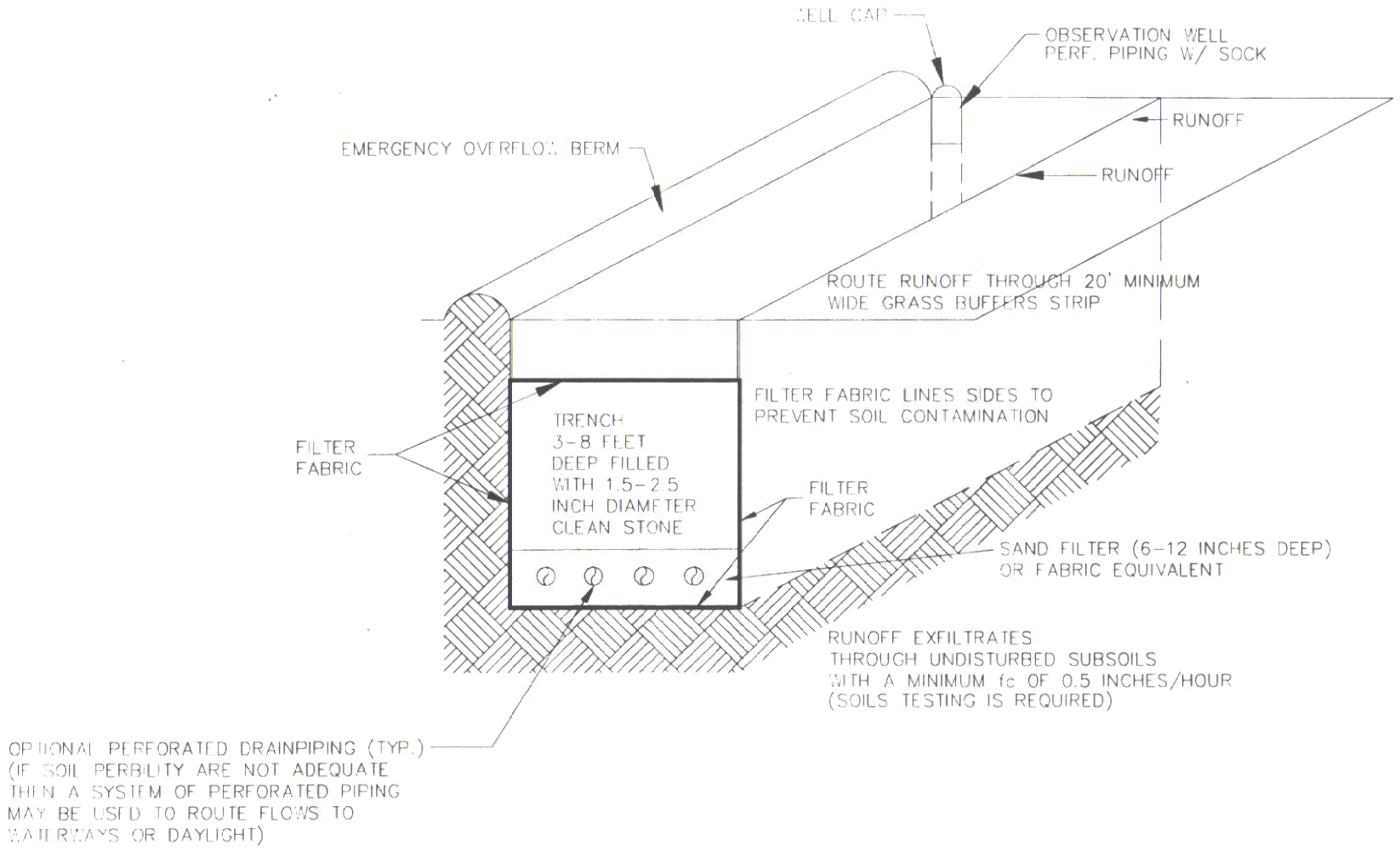
SCHEMATIC OF AUSTIN FIRST-FLUSH BASIN - FULL SEDIMENTATION DESIGN

FIG. 6



TYPICAL LINEAR STORM WATER FILTER (SAND FILTER)

FIG. 7



INFILTRATION TRENCH

FIG. 8

Appendix B

Table 1
Water Quality Best Management Practice (BMP) Removal Efficiencies

BMP Description	Percent Removal Allowance
Detention Ponds:	
Extended Detention Ponds	60 %
Wet Detention Ponds	60 %
Constructed Wetlands	70 %
Vegetative Filtration:	
Filter Strips	20 %
Grass Swale	40 %
Infiltration and Filtration:	
Austin First-Flush Filtration Basin	80 %
Sand Filters	70 %
Infiltration Trenches	50 %
Zero Discharge Facilities	90 %

Appendix C

Table 2
Water Quality Median Concentrations

Pollutant	Pre-Development Median	Commercial/Industrial Median
BOD(mg/l)	8.0	9.3
COD (mg/l)	40	57
TSS (mg/l)	70	69
Total Lead (ug/l)	30	104
Total Copper (ug/l)	0	29
Total Zinc (ug/l)	195	226
TKN (mg/l)	0.965	1.18
NO2 + NO3 (mg/l)	0.543	0.572
Total P (mg/l)	0.121	0.201
Soluble P (mg/l)	0.026	0.08
pH	7.0-9.0	7.0-9.0
BOD	_____	_____
Dissolved Oxygen (ppm)	_____	_____

Appendix D

Glossary of Terms

- **Best Management Practices (BMP):** Specific practices (structural or non-structural), preventive measures or controls used to reduce non-point source inputs to receiving waters in order to achieve water quality protection goals.
- **Built-upon area:** That portion of a development project that is covered by impervious or partially impervious cover including buildings, pavement, gravel (for pedestrian or vehicular use), recreation facilities (e.g. tennis courts), etc. (Note: wooden slatted decks and the water area of a swimming pool are not considered built-upon area.)
- **Natural Conveyance System:** Any feature of the landscape or earth, manmade or natural, that carries water in a concentrated flow.
- **Credit:** A specified percentage reduction in fee for property owners that satisfy credit policy requirements.
- **Design Storm:** A rainfall event of specified size and return frequency that is used to calculate the peak discharge rate.
- **Detention:** The temporary storage of storm runoff in a basin or lake, which is used to control the peak discharge rate.
- **Equivalent Residential Unit (ERU):**for storm water billing purposes impervious surface is divided into two thousand five hundred forty three (2543) square feet.
- **Impervious Area:** An area composed of any material that impedes or prevents natural infiltration of water into the soil. Impervious areas shall include but are not limited to roofs, decks, driveways, patios, sidewalks, parking areas, tennis courts, concrete or asphalt streets, crushed stone and gravel surfaces.
- **Intensity-duration-frequency curve:** A statistical plot relating intensity, duration, and frequency of design rainfalls. *For the purpose of evaluation, the City assumed an intensity of 8.0 in/hr. This value is based on a 10-year design storm. However, if post developed area is a shopping center, downtown area, or other heavily paved area, assumed intensity is increased by a factor of 1.12 %.*
- **Management Program:** A management program should include: description of specific practices to be implemented, proposed program implementation schedule, schedule of specific activities related to implementation schedule, description of how program goals and objectives are to shared with personnel and site schematic.
- **Outfall:** A point source at the point where a municipal separate storm sewer discharges to waters of the United States and does not include open conveyances connecting two municipal separate storm sewers, or pipes, tunnels or other conveyance which connect segments of the same stream or other waters of the United States and are used to convey waters of the United States.
- **Non-Structural Controls:** A storm water management method that does not require the construction of devices or facilities for the purpose of storm water runoff control or water quality enhancement. Emphasis is on prevention and programmatic solutions to surface water pollution.
- **Peak Discharge (Qp):** The maximum instantaneous rate of flow during a storm, usually in reference to a specific design storm event.

- **Point Discharge:** Additions of pollutants into waters of the United States from: Surface runoff which is collected or channeled by man; discharges through pipes, sewers, or other conveyance owned by a State municipality, or other person which does not lead to a treatment works; and discharges through pipes, sewers, or other conveyance, leading into privately owned treatment works.
- **Rational Method (Q= CIA):** An engineering formula for the estimation of peak storm water runoff rates from small urban and rural watersheds.
- **Retention:** The holding of runoff in a basin without release except by means of evaporation, infiltration, or emergency bypass.
- **Runoff:** The part of precipitation that flows toward a stream on the ground surface (surface runoff) or within the soil (subsurface runoff).
- **Runoff Coefficient:** The ratio of runoff to precipitation. *Runoff coefficients assumed for pre-development and post development are .20 and .80 respectively.*
- **Storm Water:** Storm water runoff, snow melt runoff, and surface runoff and drainage.
- **Structural Control:** A storm water management method that requires the construction of devices or facilities for the purpose of storm water runoff control or water quality enhancement.
- **Swale(Ditch):** Open channel that infiltrates and/or transport runoff waters.
- **Time Of Concentration:** The time required for a particle of water to flow from the most remote point in any section of the drainage area to point of design.
- **Water Quality:** Based on water properties including presence of heavy metals, suspend solids (TSS), nutrients, pH, and chemical oxygen demand (COD).
- **Water Quality Basin:** A constructed structural control to improve water quality and remove selected pollutants.
- **Zero Discharge Facilities:** A storm water management method which captures and contains 100% of storm water runoff within property boundaries.

REFERENCES

Debo,T.N. and Reese, A.J., (1995), Municipal Storm Water Management,CRC Press, Inc.

Guilford County Planning and Development Department (c. 1994), "Water Quality Protection Manual,"Greensboro, NC.

Appendix E

Storm Water Credit Application

(Please print or type)

Part I. Background Information

Account Number _____

Property Address /Description _____

_____

Owner

Name:_____

Title:_____

Address:_____

_____

_____

Telephone Number _____

Authorized Representative (if applicable)

Name:_____

Title / Position _____

Address:_____

_____

_____

Telephone Number _____

Please note that this application must be renewed on an annual basis.

Please provide requested background information.

The following items must be attached to show that the property meets the fee reduction criteria:

a. Site Plan showing:
- Property location
- Impervious areas
- Topography and drainage boundaries for discharges and BMP's.
- NPDES Permitted outfalls.

b. Plans and design calculations for proposed or existing BMP's.

Total Site Area [(1)]= _____acres

Drainage area (D_A) to BMP = _____acres

NPDES Permit Holder yes [ ] no [ ]

Note: If using multiple BMP's please attach required additional sheets.

Part II.

Non-Point Source (NPS) Pollution Control : Please provide the following background information.

Please refer to NPS Pollution Control Criteria in credit policy.

All of the following criteria must be met in order to receive the 5% NPS Pollution Control credit.

If any of the NPS pollution control criteria does not pertain to your business, please write "does not apply".

If a representative other than the one identified under "General Information" is overseeing the "non-point source pollution control" component of the credit program, please provide the following information:

Person responsible for coordinating non-structural activities:_____

Title / Position:_____ Tel. #_____

Time of day person may be reached:_____ # of Personnel_____

Storm Water Credit Application

(Please print or type)

(Criteria 1) Educational Programs

1) Where and when will environmental information and literature be posted and distributed?

_____

_____

2) How will environmental information / literature be distributed directly to organizational personnel?

_____

_____

(Criteria 2) On Site Refuse Management

1) Identify where waste and recycling material disposal information will be posted:

_____

_____

2) Describe your on-site waste material recycling program. Specifically:

_____

_____

Number of recycling material collection sites located on property: _____

Number of dedicated recycling dumpsters / cans which are serviced by a waste removal provider. _____

Frequency of recycling dumpster service: _____

3) How are on-site refuse containers which are exposed to wind, rain, snow (etc.) covered?

_____

_____

(Criteria 3) Storm Water Structure Maintenance & Cleaning

1) ~~Using the attached billing map~~, identify Storm Water structure locations on property. (please refer to Credit Policy for a glossary of storm water structure terminology)

2) Please identify the maintenance and cleaning schedules for the following storm water structures: (enter "N/A" for structures that do not exists.)

Catch Basins & Outfalls:

_____

_____

Curb & Gutter:

_____

_____

Other Structures:

_____

_____

Storm Water Credit Application

(Please print or type)

(Criteria 4) Paved Area Sweeping

1) How often will parking lot sweeping / cleaning activities take place?

2) Describe the organizations parking lot sweeping / cleaning program.

How will sweeping be conducted?

What type of equipment will be used?

Which days of the week and at what time will sweeping be routinely conducted?

3) If using a contracted firm to conduct sweeping, please indicate contract information (company name, address, telephone number, contract number, length of contract, contract expiration date).

(Criteria 5) Used Motor Oil Recycling Program

1) Location of used motor oil recycling facility.

2) Is motor oil reprocessed on site? Yes No

3) If answer to 3 is "No", please indicate contract information (company name, address, telephone number, contract number, length of contract, contract expiration date) for company that handles removal of used motor oil from site.

4) Indicate the amount of used motor oil collected on - site per month.

5) Indicate the amount of used motor oil which is collected on site and reprocessed or sent to be reprocessed per month.

Non-Point Source Pollution Control Credit _____%

Stormwater Credit Application
(Please print or type)

Part III. Stormwater Quality and Runoff Control Credit Computations.

The computations will be computed consistent with the following format. These computations are based on the rational method using assumed average runoff coefficients for various land uses.

Part IIIA:
Runoff Control Credit Computations. (Maximum 20%)

Runoff Control (Qp) Calculations, please compute:

Pre-Development (Qpre) runoff = 1.6 X DA to BMP= _____ cfs

Post Development (Qpost) runoff without BMP (1) = 6.4 X DA to BMP= _____ cfs

Post Development (Qpost) runoff with BMP = _____ cfs

% Reduction Calculation = $\frac{\text{(Qpost) without BMP - (Qpost) with BMP x \% runoff routed through BMP}}{\text{(Qpost) without BMP - (Qpre)}}$

% Reduction= _____ %

Runoff Control Credit = % reduction x $\frac{\text{DA to BMP}}{\text{Total Site Area}}$ x 20%

Runoff Control Credit= _____ %

Part IIIB:
Water Quality Control (Maximum 15%)

Water Quality Credit = % runoff routed through drainage basin x % pollutant removal rate x 15% max- credit. (2)

Water Quality Credit= _____ %

(1) In 90% or greater impervious areas, the factor 6.4 will change to 7.2
(2) For Pollutant Removal Achieved for BMP's, refer to Table 1 in Appendix B of credit policy.

Stormwater Credit Application

(Please print or type)

Part IV:

Credit: Compute Stormwater credit (Maximum 40%)

Non-Point Source Pollution Control Credit + Runoff Control Credit + Water Quality Credit = Stormwater Credit.

STORMWATER CREDIT = _____ %

The application packet should consist of the application forms and 2 copies of applicable plans which will allow for a complete review of the site and existing/proposed stormwater controls. The above items must be included to receive a stormwater services credit.

Submit a copy of plans and calculations to

City of Greensboro
Stormwater Management Division
P.O. Box 3136
Greensboro. NC 27402-3136

Signature (Owner or Authorized Representative): _____

Date: _____